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FOREIGN TECHNOLOGY DIVISION

ORGANIZING AN INFORMATION SYSTEM BASED ON THE "DNEPR" COMPUTER

by

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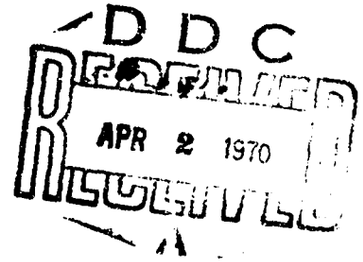

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EDITED MACHINE TRANSLATION

ORGANIZING AN INFORMATION SYSTEM BASED ON THE "DNEPR" COMPUTER

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

* ye initially, after vowels, and after ъ, ь; e elsewhere. When written as ё in Russian, transliterate as yё or ё. The use of diacritical marks is preferred, but such marks may be omitted when expediency dictates.

– in any moment access on the part of subscribers of the information system is allowed for information material and information input from the workstations to change arrays of information and economic data;

– its free time the ETsVM solves computational problems.

Organization of exchange. Requirements of high ETsVM work efficiency pose, in a new fashion, the question of organizing information exchange between man and the machine. The traditional work of the operator at the machine panel is becoming impermissible, since for all three of the above-mentioned basic types of problems, information exchange occurs when the machine, generally speaking, is already solving other problems.

In accordance with the assignment and parameters of IUS, 3 basic modes of operator-machine information exchange are accepted:

– the information system mode,

– the array change mode,

– the computer system mode.

The possibility of system work in these modes is ensured by the supervisory routine in the presence of a corresponding complex of external devices and a library of routines.

The general layout of information exchange in the system man-machine is shown in Fig. 1. The man and the machine are joined together by several information channels, a part of which serves for information flow in the man-machine direction, and a part for the opposite direction; the remaining ones are for both directions. Information exchange occurs in separate sessions, starting, as a rule, at the man's (operator's) initiative. Exceptions are those cases when the machine sends information about short duration failures or breakdowns – emergency information. In this case the session starts at the initiative of the machine.

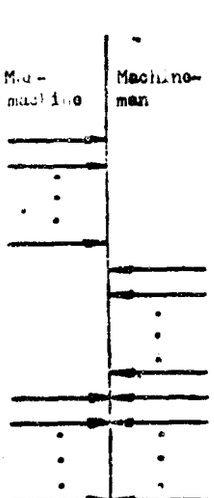

Fig. 1. General diagram of exchange in the man-machine system.

Every session generally consists of several elementary sessions - exchanges of messages (or simply exchanges). The number of exchanges in a session in the UVS (General-Purpose Computer System) "Dnepr" varies from two to four and depends on the mode in which the system is working. Every exchange consists of two messages - the "man" message (operator) and the "machine" message. Let us designate the operator's message by the letters a, b, c, and d, and the corresponding answer messages from the machine by the same letters with primes - a', b', c', d'.

The first exchange establishes the connection between the operator and the machine; the last exchange is an exchange of basic information, for example, for the case of solving a computational problem, it is the input of the routine and initial data by the operator and the output of a solution by the machine. Intermediate exchanges (if they exist) serve for a preliminary exchange of official information, enabling the machine to be tuned for a certain form of work and to send the operator readings concerning the order of input, external devices for input and output, etc.

All messages (except the last two) are formed in a special (operational) language and are called reports. The operational

language completely reflects the capabilities of the system with respect to possible conditions of information exchange between the operator and the machine, and on the language's flexibility, to a considerable degree, depends the effectiveness of system use. In general, the operational language consists of two parts: a set of reports on problem servicing and a set of reports on machine servicing. Recording of these reports conforms to certain syntactical rules; in most cases these rules are considerably simpler than the rules for universal algorithmic languages.

For UVS an operational language has been developed (Operkod) which is one of the component parts of the mathematical provision system. Exchange diagrams for the different modes are shown in Fig. 2.

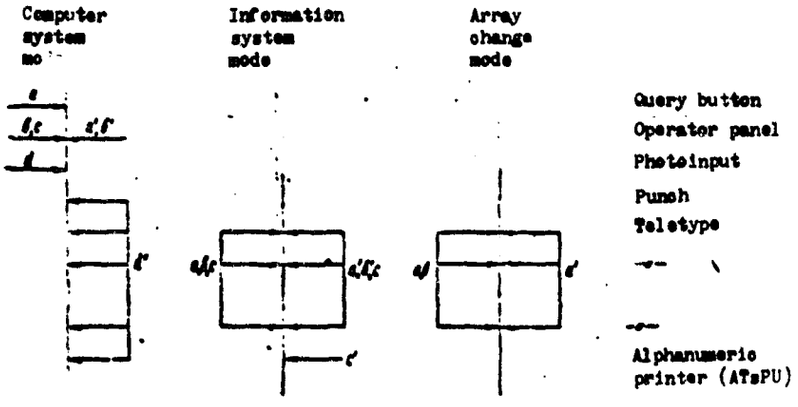

Fig. 2. Operator-machine exchange diagram of the UVS "Dnepr-2."

As can be seen from Fig. 2, in the *computer system mode* the session starts by sending message *a* through the query button. Return message *a'* is issued by the machine to the operator panel (PO) and consists of a printout of sign =.

Message *b* is produced by the operator through the PO; in it the priority is indicated, with which the problem should be received and solved. For computational problems there are three levels of priority: 1, 2 and 3 (in decreasing order). Message *b'* completely coincides with *a'*.

Message *c* (also introduced through the PO) is the certificate of the problem, which includes the name of the problem, its solution code, information about input-output devices which is necessary for its solution and a number of arguments for the routine. In contents the certificate is similar to the operator of access to the procedure in the ALGOL-60 language. The problem certificate constitutes one of the basic syntactic constructions of the operational language. The report on problem callup has a form to which it is easy to bring any queries into the information system, which are written in the information language.

Message *c'* is absent, since the machine itself, from the photoinput, introduces the routine (message *d*), which should, by this time, be prepared by the operator for input. Message *d'* is the solution of the problem and is issued through any of the teletypes or through the alphanumeric printer (ATsPU).

In the *information system mode*, the session of exchange occurs through the teletypes, with the exception of the information system answer (message *c'*), which, in the case of a great volume of information, is printed on the ATsPU. The form and contents of the messages are as follows:

Message	Form of the message	Contents
a	?	Input query
a'	=	Permission for input
b	1 or 2	Priority
b'	=	Permission for following input
c	Query in the information language	
c'	Answer of the information system in the language	

The array change mode is characterized by a shorter session of exchange, since the preliminary input of the priority is absent: the operator can always introduce his own data into the machine; besides, messages *c* and *c'* are absent.

The form and contents of the messages are as follows:

Message	Form of the message	Contents
a	?	Query for input
a'	=	Permission for input
b	Information for array change	

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ABSTRACT

(U) The requirements of a computer to be used in an information system are the following: it must permit parallel exchange of information over many channels; it must permit the use of different information codes, the translators of which must be compact and must provide programs guaranteeing rapid operation and effective memory; it must limit the maximum time devoted to a problem in conformity with the requirements of an efficient system. This article describes one possible variant for organizing exchanges in an operational system developed as an information-control system. The basis for this system is the "Dnieper" electronic digital computer, a fast-acting device which can handle 20,000 additions per second, has a capacity of 32,000 words of 32 bits each, can store up to $8 \cdot 10^6$ words on magnetic tape, and contains a letter-digit printing device, tens of teletypes, and a keyboard operating panel. A description of the information exchange in such a system is given. Orig. art. has: 2 figures.